

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
14 July 2005 (14.07.2005)

PCT

(10) International Publication Number  
**WO 2005/062756 A3**

(51) International Patent Classification<sup>7</sup>: **HO1Q 13/08**

(21) International Application Number:  
PCT/US2004/040928

(22) International Filing Date:  
7 December 2004 (07.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
200310123225.8  
18 December 2003 (18.12.2003) CN

(71) Applicant (for all designated States except US): **MO-  
TOROLA INC.** [US/US]; 1303 East Algonquin Road,  
Schaumburg, IL 60196 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SU, Wei** [CN/CN];  
10-4-503 No. 24 Huang Si Street, Beijing 100011 (CN).  
**ZHOU, Guang Ping** [CN/CN]; 613 River Garden,, Hou  
Sha Yu, Shun Yi District, Beijing 101300 (CN).

(74) Agents: **VAAS, Randall S. et al**; 600 North US Highway  
45, Libertyville, IL 60048 (US).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,

AT,AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

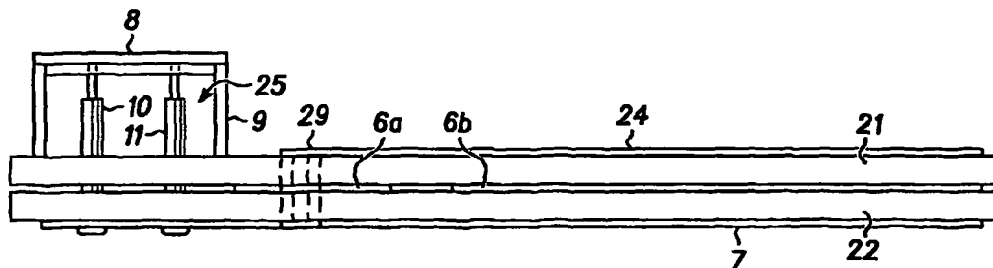
**Published:**

- with international search report
- before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments

(88) Date of publication of the international search report:  
5 January 2006

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: **AN ANTENNA RADIATOR ASSEMBLY AND RADIO COMMUNICATIONS ASSEMBLY**



(57) Abstract: An antenna radiator assembly (2) and radio communications assembly (1) comprising a circuit board (5) formed from dielectric layers dielectric layers (21, 22) supporting electrical conductors. The electrical conductors include a feed point conductive trace (23) and 10 conductive sheets (7, 24) comprising a ground plane. An antenna radiator element (8) is spaced from the circuit board (5) and when viewed in plan view there is an overlapping area (25) where most of a surface area of the antenna radiator element (8) overlaps a surface area of the circuit board (26) thereby forming a sandwiched dielectric region (15, 25). A feed point connector (11) couples the antenna radiator element (8) to the feed point conductive trace (23) and a ground connector (10) couples the antenna radiator element (8) to the ground plane. The circuit board dielectric layers (21, 22) in the sandwiched dielectric region (25) are disposed between the antenna radiator element (8) and (20) the ground plane.

WO 2005/062756 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/40928

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC(7) : HOIQ 13/08 US CL : 343/700MS,702,829:342/386 According to International Patent Classification (IPC) or to both national classification and IPC														
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) U.S. : 343/700MS,702, 829:342/386 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)														
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <table border="1"> <thead> <tr> <th>Category *</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>US 5,006,859 A (Wong et al) 09 Apr 1991 (09.04. 1991), col. 3, lines 57 +</td> <td>1-24</td> </tr> <tr> <td>A</td> <td>US 5,001,492 A (Shapiro et al) 19 Mar 1991 (19.03. 1991), whole document</td> <td>1-24</td> </tr> <tr> <td>A</td> <td>US 5,488,380 A (Harvey et al) 30 Jan 1996 (30.01. 1996), whole document</td> <td>1-24</td> </tr> </tbody> </table>			Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 5,006,859 A (Wong et al) 09 Apr 1991 (09.04. 1991), col. 3, lines 57 +	1-24	A	US 5,001,492 A (Shapiro et al) 19 Mar 1991 (19.03. 1991), whole document	1-24	A	US 5,488,380 A (Harvey et al) 30 Jan 1996 (30.01. 1996), whole document	1-24
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X	US 5,006,859 A (Wong et al) 09 Apr 1991 (09.04. 1991), col. 3, lines 57 +	1-24												
A	US 5,001,492 A (Shapiro et al) 19 Mar 1991 (19.03. 1991), whole document	1-24												
A	US 5,488,380 A (Harvey et al) 30 Jan 1996 (30.01. 1996), whole document	1-24												
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.														
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "B" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "I" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family														
Date of the actual completion of the international search 15 September 2005 (15.09.2005)		Date of mailing of the international search report <b>02 NO 2005</b>												
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer <i>R. J. B. B. B.</i> Binh Van Ho Telephone No. 571 272 8583												